

WHAT IS CLAIMED IS:

1. A polymer actuator comprising a conductive powder compact, an ion donor, a work electrode and a counter electrode, wherein said powder compact comprises conductive powder containing a conductive polymer and a conductive material other than said conductive powder whereby said actuator contracts or extends by voltage applied between said work electrode and said counter electrode.
2. The polymer actuator according to claim 1, wherein said conductive polymer has a conjugated structure.
3. The polymer actuator according to claim 1 or 2, wherein said conductive polymer is at least one selected from the group consisting of polypyrrole, polythiophene, polyaniline, polyacetylene and their derivatives.
4. The polymer actuator according to any one of claims 1 to 3, wherein said conductive material is in a powdery, net and/or porous form.
5. The polymer actuator according to any one of claims 1 to 4, wherein said conductive material is at least one selected from the group consisting of platinum, gold, palladium, nickel and carbon.
6. The polymer actuator according to any one of claims 1 to 5, wherein said ion donor is in the form of a solution, a sol, a gel or a combination thereof.
7. The polymer actuator according to any one of claims 1 to 6, wherein said ion donor contains an amphiphatic compound.
8. The polymer actuator according to any one of claims 1 to 7, wherein said ion donor has a binder function.
9. The polymer actuator according to any one of claims 1 to 8, wherein said work electrode is in contact with said powder compact, said counter electrode is disposed in said ion donor at a position separate from said powder compact.

10. The polymer actuator according to any one of claims 1 to 9, having pluralities of said powder compacts and pluralities of said work electrodes alternately arranged in tandem.
11. The polymer actuator according to any one of claims 1 to 10, wherein the ratio of said conductive material to said powder compact is 1 to 99% by mass.
12. The polymer actuator according to any one of claims 1 to 11, wherein the electric resistance of said conductive powder is $10^{-4} \Omega$ to 1 $M\Omega$.
13. The polymer actuator according to any one of claims 1 to 12, wherein said conductive powder has an average particle size of 10 nm to 1mm.
14. The polymer actuator according to any one of claims 1 to 13, wherein said powder compact has an electric conductivity of 10^{-3} to 10^5 S/cm.